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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/977,646	10/15/2001	Saverio Mascolo	U 013666-5	3228

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EXAMINER
CHANKONG, DOHM

ART UNIT	PAPER NUMBER
2152	

DATE MAILED: 08/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
Office Action Summary	09/977,646	MASCOLO, SAVERIO
	Examiner	Art Unit	
	Dohm Chankong	2152	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>06 June 2005</u>.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-20</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-20</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
        application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1>   This action is in response to Applicant's amendment and remarks. Claims 18-20 have

been added. Claims 1-20 are now presented for further examination.

2>   This is a final rejection.

Response to Arguments

3>   Applicant's arguments with respect to claims 1-17 have been considered but are moot

in view of the new ground(s) of rejection.

4>   Zhao was used by Examiner as a secondary reference to teach the utilizing of a low-

pass filter to obtain a filtered value of samples of bandwidth. Applicant argues against Zhao

stating that the invention was directed towards "estimating the bandwidth by other

connections at a switch/router link".

However, Examiner believes that Zhao was merely utilized to disclose the

functionality of using a filter to filter samples of bandwidth for the purpose of eliminating

"unnecessary highly frequent adoptions of ABR traffic rate" or essentially noise [see Zhao,

column 3 «lines 41-48»]. Examiner argues that the primary reference discloses the desired

"estimating end-to-end bandwidth between a server and client", but was deficient in utilizing

a low-pass filter. Zhao compensates for this deficiency by providing apt motivation to

implement a low-pass filter within the end-to-end bandwidth estimation system of the

primary reference. Therefore, Examiner believes that the Zhao reference is relevant and proper.

5> Additionally, Applicant argued that the coefficients disclosed by Zhao were not time-varying. Examiner disagrees. Zhao discloses that the coefficients are dependant on time [$r(t)$, $x(t)$, see column 8 «lines 50-55»]. Therefore, since the coefficients are a function of time, then the coefficients are time-varying.

Allowable Subject Matter

6> Claims 4, 7, 13-15 and 20 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7> Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. There seems to be several antecedent problems within the claims. The following examples are not a complete list and the rest of the claims should be examined by Applicant as well.

a.   Claim 1 is rejected for lacking proper antecedent basis: "the flow", "the ratio", "the sender", "the receiver side", "the sender side", "the time interval". It should also be noted that there could be confusion over the use of "the routine" as there are three routines being disclosed within the claim.

b.   Claim 2 is rejected for lacking proper antecedent basis: "the amount of data", "the previous ACK", "the ACK one congestion window of packets before", "the previous packet", "the packet one congestion window of packets before", "the current ACK", "the current packet".

c.   Claim 12 is rejected for lacking proper antecedent basis: "the advertised window of TCP", "the minimum of the advertised window", "the bandwidth estimate", "the round trip time". Furthermore, claim 12 is rejected for containing confusing claim language. It is unclear how to "set" the advertised window of TCP" because the relationship between the minimum of the window, the bandwidth estimate and the minimum round trip time is vague and not clear [For example, is the minimum round trip time multiplied to both the minimum advertised window and the bandwidth estimate or just the bandwidth estimate? Is the minimum of the advertised window added/substracted/multipled to the bandwidth estimate?].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art

are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8>   Claims 1-3, 5, 6, 8, 10 and 17-19 are rejected under 35 U.S.C § 103(a) as being

unpatentable over Schober et al, U.S Patent Publication No. 2001|0044835 ["Schober"], in

view of Zhao et al, U.S Patent No. 6.144.639 ["Zhao"].

9>   As to claim 1, Schober discloses an end-to-end estimation of the bandwidth available

in a client-server connection established over a packet switching network, comprising:

a routine to compute bandwidth samples as the ratio of the amount of received data

packets over the time interval during which data packets are received if the routine is

implemented at the receiver side, or as the ratio of the amount of data packets acked over the

time interval during which data are acked if the routine is implemented at the sender side

[0005, 0076, 0077].

Schober discloses a routine to compute samples of available bandwidth by taking into

account the flow of packets received by the client, if the routine is implemented at the

receiver side, or by taking into account acknowledgement or report packets received by the

sender, if the routine is implemented at the sender side [0005, 0076, 0077] but does not

explicitly disclose taking into account their arrival times. However, the use of each packet's

arrival times is obvious because Schober discloses calculating the available bandwidth

utilizing the time to send a certain amount of packet data. Therefore, Schober's system

would necessarily need to keep track of the flow of packets' arrival times to achieve this

functionality. Therefore, it would have been obvious to one of ordinary skill in the art to have reasonably inferred that Schober's system would take into account the arrival time of packets in order to calculate the available bandwidth.

Schober does not explicitly disclose a discrete time low-pass filter.

10>   Zhao discloses a routine that implements a discrete time low-pass filter to obtain a filtered value of the samples of available bandwidth [abstract | column 3 «lines 34-48» | column 4 «lines 8-16» | claim 19]. It would have been obvious to one of ordinary skill in the art to incorporate Zhao's low-pass filtering into Schober's bandwidth estimation method for the added advantage of smoothing out high frequency traffic from measuring the link capacity (bandwidth) of the network as taught by Zhao [column 3 «lines 41-48»].

11>   As to claim 2, Schober discloses the end-to-end bandwidth estimation according to claim 1, wherein a sample of available bandwidth b_j at time t_j is computed as:

$$b_j = \frac{d_j}{t_j - t_{j-1}}$$

where d_j is the amount of data that have been received at the receiver or acknowledged at the sender in the interval $t_j - t_{j-1}$, t_{j-1} is the time when the previous ACK or the ACK one congestion window of packets before was received by the sender or the time when the previous packet or the packet one congestion window of packets before was received by the receiver, and t_j is the time when the current ACK is received by the sender or when the current packet is received by the receiver [0005, 0076, 0077 where : Schober does not

explicitly disclose the claimed formula, but discloses estimating bandwidth based on a certain amount of data and the amount of time it took to transmit said amount of data which corresponds in functionality to the claimed formula].

12>   As to claim 3, Schober does not explicitly disclose the end-to-end bandwidth estimation according to claim 1, wherein the routine implements a discrete time low-pass filter with time-varying coefficients.

13>   Zhao discloses a routine implementing a discrete time low-pass filter with time-varying coefficients for estimating bandwidth [column 7 «lines 22-29» | column 8 «lines 50-66» | column 9 «lines 43-58»]. It would have been obvious to incorporate Zhao's time-varying coefficients and low-pass filter into Schober's bandwidth estimation method for the added advantage of smoothing out high frequency traffic from measuring the link capacity of the network over a period of time as taught by Zhao.

14>   As to claim 5, Schober discloses a method for adapting the amount of data for unit time of time, i.e. the rate, sent by the server to the client over a packet network, comprising an end-to end bandwidth estimation according to claim 1 [see claim 9 in Schober, and see the rejection of claim 1 in this action].

15> As to claim 6, as it merely is a method that performs the steps of the system of claims 1 and 3, it does not teach or further define over the claims. Therefore, claim 6 is rejected for similar reasons to claims 1 and 3, supra.

16> As to claim 8, as it merely is a method that performs the steps of the system of claims 1 and 3, it does not teach or further define over the claims. Therefore, claim 8 is rejected for similar reasons to claims 1 and 3, supra.

17> As to claim 10, as it merely is a method that performs the steps of the system of claims 1 and 3, it does not teach or further define over the claims. Therefore, claim 10 is rejected for similar reasons to claims 1 and 3, supra.

18> As to claim 17, as it merely is a method that performs the steps of the method of claim 1 and 2, it does not teach or further define over the limitations of those claims. Therefore, claim 17 is rejected for similar reasons to claims 1 and 2, supra.

19> As to claim 18, Schober discloses a method for adapting the amount of data for unit time of time, i.e. the rate, sent by the server to the client over a packet network, comprising an end-to end bandwidth estimation according to claim 2 [see claim 9 in Schober, and see the rejection of claim 2 in this action].

20>   As to claim 19, Schober discloses a method for adapting the amount of data for unit time of time, i.e. the rate, sent by the server to the client over a packet network, comprising an end-to end bandwidth estimation according to claim 3 [see claim 9 in Schober, and see the rejection of claim 3 in this action].

21>   Claim 12 is rejected under 35 U.S.C § 103(a) as being unpatentable over Schober and Zhao, in further view of Chapman et al, U.S Patent No. 6.493.316 ["Chapman"].

22>   Schober discloses computing the bandwidth according to claim 1, but does not explicitly disclose a method for setting the advertised window of TCP equal to the minimum of the Advertised Window and the bandwidth estimate times the minimum round trip time.

23>   Chapman discloses a method for setting the advertised window of TCP equal to the minimum of the Advertised Window and the bandwidth estimate times the minimum round trip time [Figure 5 | column 6 «lines 22-54» | column 8 «lines 35-50»]. It would have been obvious to one of ordinary skill in the art to combine Schober's bandwidth estimation techniques with Chapman's window sizing capability to enable a dynamic method of determining the amount of data to be transmitted. This is further suggested by Schober because he adapts the kind of content and the amount of content to be transmitted based on the estimated bandwidth.

24>   Claims 9, 11 and 16 are rejected under 35 U.S.C § 103(a) as being unpatentable over

Schober and Zhao, in further view of Albuquerque et al, "An End-to-End Source-Adaptive

Multi-layered Multicase (SAMM) Algorithm" ["Albuquerque"].

25>   As to claim 9, Schober discloses end-to-end bandwidth estimation according to claim 1

[see claim 1] and does suggest adaptively selecting the quality of content [0011] but does not

explicitly disclose a method for adaptively selecting the quality of coding, or the numbers of

layers to be transmitted in a layered coding of an audio/video source using the TCP protocol,

or the UDP protocol, or the RTP protocol.

26>   Albuquerque discloses a method for adaptively selecting the quality of coding, or the

numbers of layers to be transmitted in a layered coding of an audio/video source using the

TCP protocol, or the UDP protocol, or the RTP protocol [abstract | '1 Introduction' | '3

Architecture and Algorithm']. It would have been obvious to one of ordinary skill in the art

to incorporate Albuquerque's end-to-end adaptive selection of the quality of coding and the

numbers of layers to be transmitted into Schober's bandwidth estimation system. One would

have been motivated to perform such an implementation to increase the functionality of

Schober's adaptive content selection to include the ability to select the layers of video as

taught by Albuquerque.

27>   As to claim 11, Schober discloses bandwidth estimation comprising:

        a routine to compute samples of available bandwidth by taking into account packets

received by the client, if the routine is implemented at the receiver side, or by taking into

account acknowledgement packets received by the sender, if the routine is implemented at

the sender side [0005, 0076, 0077].

Schober does not explicitly disclose the other limitations of the method of claim 11.

28>   Zhao discloses a routine that implements a discrete time low-pass filter to obtain a

filtered value of the samples of available bandwidth over a packet network, comprising an

end-to-end bandwidth [abstract | column 3 «lines 34-48» | column 4 «lines 8-16» | claim 19]. It

would have been obvious to one of ordinary skill in the art to incorporate Zhao's low-pass

filtering into Schober's bandwidth estimation method for the added advantage of smoothing

out high frequency traffic from measuring the link capacity of the network as taught by

Zhao.

29>   Albuquerque discloses a method for adaptively selecting the quality of coding, or the

numbers of layers to be transmitted in a layered coding of an audio/video source according to

claim 9, comprising:

increasing step by step the quality of coding, or the numbers of layers to be

transmitted in a layered coding of an audio/video source until congestion is experienced by

means of control packets [abstract | '1 Introduction' | '3 Architecture and Algorithm' | '4

Video Encoder Rate Control'];

setting the quality of coding or select the numbers of layers to be transmitted after

that a congestion episode is signaled by means of control packets [abstract | '1 Introduction' |

'3 Architecture and Algorithm' | '4 Video Encoder Rate Control']; and

increasing again step by step the quality of coding or the number of layers to be

transmitted in a layered coding to probe for extra available bandwidth [abstract | '1

Introduction' | '2 Sender-Driven vs. Receiver-Driven Adaptation' | '3 Architecture and

Algorithm' | '4 Video Encoder Rate Control'].

It would have been obvious to one of ordinary skill in the art to incorporate

Albuquerque's end-to-end adaptive selection of the quality of coding and the numbers of

layers to be transmitted into Schober's bandwidth estimation system. One would have been

motivated to perform such an implementation to increase the functionality of Schober by

allowing Schober the ability to adaptively multicast video over his protocol based on the

estimate of available bandwidth in the network. This type of functionality is suggested by

Schober as he discloses adaptively selecting different qualities of content based on the

estimated bandwidth [0011].

30>   As to claim 16, as it does not teach or further define over the limitations of claim 11, it

is rejected for similar reasons as claim 11, <u>supra</u>.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

U.S Patent No. 6.587.875 to Ogus.

Applicant's amendment necessitated the new ground(s) of rejection presented in this

Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the

advisory action. In no event, however, will the statutory period for reply expire later than

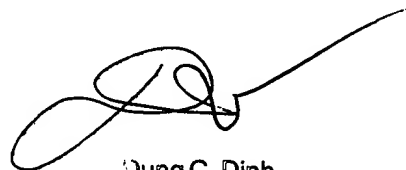SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Dohm Chankong whose telephone number is (571)272-3942.

The examiner can normally be reached on 8:30AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Glenton Burgess can be reached on (571)272-3949. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published

applications may be obtained from either Private PAIR or Public PAIR. Status information

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about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on

access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-

9197 (toll-free).

DC

Dung C. Dinh
Primary Examiner